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GCSE

Chapter 4: Research Methods

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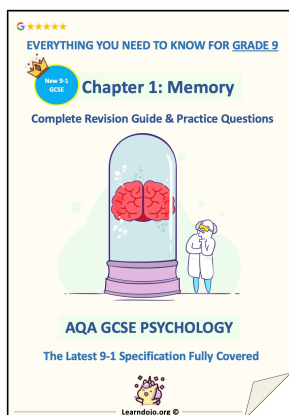


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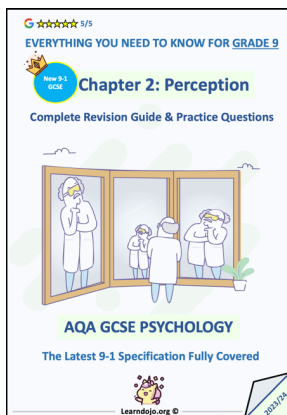
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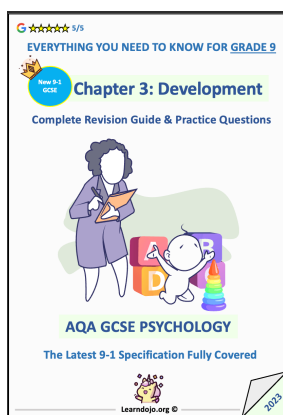
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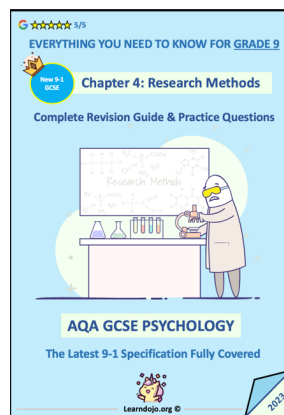
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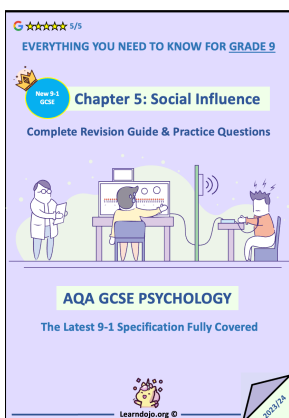
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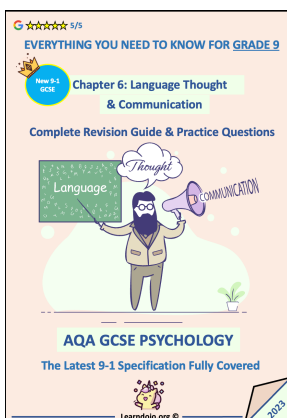
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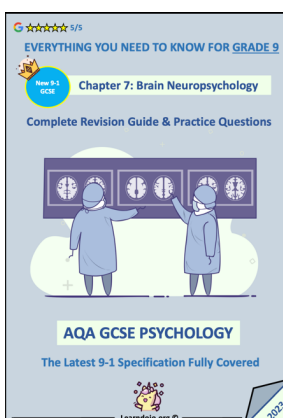
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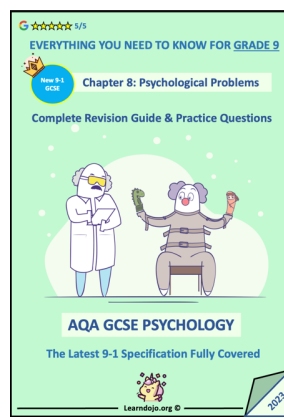
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This resource covers AQA GCSE Psychology and the research methods topic. Everything in this pack follows the specification exactly so it should provide you with everything you need to know to master this topic.

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What the specification says you need to know for Research Methods..

Content	Additional Info
Formulation of testable hypotheses	Null hypothesis and alternative hypothesis
Types of variable	Independent variable, dependent variable, extraneous variables.
Sampling methods	<p>Target populations, samples and sampling methods and how to select samples using these methods:</p> <ul style="list-style-type: none">• Random• Opportunity• Systematic• stratified <p>Strengths and weaknesses of each sampling method.</p> <p>Understanding principles of sampling as applied to scientific data.</p>
Designing research	<p>Quantitative and qualitative methods:</p> <ul style="list-style-type: none">• the experimental method (experimental designs, independent groups, repeated measures, matched pairs, including strengths and weaknesses of each experimental design)• laboratory experiments• field and natural experiments• interviews• questionnaires• case studies• observation studies (including categories of behaviour and interobserver reliability). <p>Strengths and weaknesses of each research method and types of research for which they are suitable.</p>
Correlation	<p>An understanding of association between two variables and the use of scatter diagrams to show possible correlational relationships.</p> <p>The strengths and weaknesses of correlations.</p> <p>Computation of formulae is not required.</p>
Research procedures	The use of standardised procedures, instructions to participants, randomisation, allocation to conditions, counterbalancing and extraneous variables (including explaining the effect of extraneous variables and how to control for them).
Planning and conducting research	<p>How research should be planned, taking into consideration the reliability and/or validity of:</p> <ul style="list-style-type: none">• sampling methods• experimental designs• quantitative and qualitative methods.
Ethical considerations	<p>Students should demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none">• ethical issues in psychological research as outlined in the British Psychological Society guidelines• ways of dealing with each of these issues.



Specification cont.

Content	Additional Info
Quantitative and qualitative data	The difference between quantitative and qualitative data.
Primary and secondary data	The difference between primary and secondary data.
Computation	Recognise and use expressions in decimal and standard form: use ratios, fractions and percentages, estimate results, find arithmetic means and use an appropriate number of significant figures.
Descriptive statistics	Understand and calculate mean, median, mode and range.
Interpretation and display of quantitative data	Construct and interpret frequency tables and diagrams, bar charts, histograms and scatter diagrams for correlation.
Normal distributions	The characteristics of normal distribution.

Formulation of Testable Hypotheses

For the formulation of testable hypotheses, the psychology specification states you need to know following:

- Null hypothesis and alternative hypothesis.



A hypothesis is simply a formal and testable statement of the relationship between two variables that is to be tested through experimentation. In psychology, as well as other sciences, we use them as part of the scientific method.

The hypothesis is not strictly speaking a prediction and should not be used in the future tense i.e. “this will happen”. It is only at the end of the study that the researcher decides whether the research evidence supports the hypothesis or not.

There are different types of hypotheses used in psychology, however, the main ones that crop up frequently are:

- Directional hypotheses
- Non-directional hypotheses
- Null hypotheses
- Alternative hypotheses

For GCSE Psychology and the AQA specification, we need to know about null hypotheses and alternative hypotheses.

What is a Null Hypothesis?

A null hypothesis is a general statement that the observed variables will have no impact as there is no relationship between them. This hypothesis assumes that any difference observed is due to sampling or experimentation errors.

An example of a null hypothesis for a hypothetical scenario is “watching television before bed has no impact on how well you sleep”

What is an Alternative Hypothesis?

The alternative hypothesis would be a prediction that one variable will affect the other.

An example would be “watching scary movies before bed affects how fast you fall asleep”. The alternative hypothesis does not specify the direction of the outcome, merely that there will be an effect.

Formulating Hypotheses

Once you know enough about hypotheses, you need to consider how to apply them. When conducting research, most of the time the experiment comes from a simple or vague idea we wish to test.

Here’s an example: does music affect peoples ability to learn?

This is rather a vague question and to turn it into a testable experiment, we need to be able to operationalise the two key variables; music and learning.

These two variables are then known as the independent variable and dependent variable – often referred to as the IV and DV for short. More information is given on them below.

Hypotheses are then easier to form, a suitable one for this experiment would be an alternative hypothesis such as:

- **“The presence or absence of music has an effect on the score in a learning test”**

A null hypothesis for this example would simply be:

- **“The presence of music has no effect on the score in a learning test”**

Type of Variables

For the different types of variables, the GCSE psychology specification states you need to know the following:

Independent variable, dependent variable, extraneous variables.

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For the different types of variables, the GCSE psychology specification states you need to know the following:

Independent variable, dependent variable, extraneous variables.

There are 3 different types of variables we need to know about which are:

- **The independent variable (IV)**
- **The dependent variable (DV)**
- **Extraneous variables.**

Independent Variable

An experiment will look to measure the effect of one variable on another. These two variables have special names, which are the independent variable and dependent variable.

The independent variable is what researchers manipulate in order to test its effect on the dependent variable (the outcome). Let's use the example mentioned earlier about music and learning to illustrate this: We are conducting an experiment to see if music affects the ability of students to learn. In this case, the independent variable (IV) we will be manipulating is music.

Within the context of an experiment, we may simply have two conditions where one group is exposed to music while another group is not while engaging in some learning activity. We would then compare the findings to assess the results.

Dependent Variable

The dependent variable (DV) is the outcome or effect we are measuring within the study. So using the example above, the dependent variable would be how well the students are able to learn with or without music. This may be measured in a number of ways (taking a memory test for example or quiz).

So to clarify – the independent variable is what we change and the dependent variable is the outcome we then measure.

A good way to remember the difference is to think of it like this:

The dependent variable “depends” on what's being changed (the independent variable). Another way would be to remember that “we measure the effect of the IV on the DV”. If you remember that the independent variable (IV) always comes first, you should be able to recall that the dependent variable (DV) is then the outcome. These are just two simple ways of remembering the difference between the IV and DV but feel free to use what works for you.

Extraneous Variable

The extraneous variable is a third variable that may unknowingly be affecting the outcome of the study (the DV).

We conduct experiments to measure the effect of the IV on the DV but sometimes extraneous variables are actually the cause of the changes. They can be seen as “nuisance variables” that affect the study and make it difficult to know whether it is the IV that affects the DV.

Let’s use that example mentioned earlier about how music may affect a student’s ability to learn. We may conduct this experiment and find that music improves learning as the students who listened to the music performed better.

We may, therefore, conclude music improves student’s ability to learn, however, what if it was actually a third variable affecting the results which is unaccounted for? (an extraneous variable).

Perhaps we find that the students who performed the best were those with prior knowledge of the questions in the test?. The extraneous variable could then be argued to be prior knowledge participants had that we have not accounted for or could control.

Looking into the study we could perhaps argue the extraneous variable may be the intelligence of participants from one group to another that is affecting the outcome. It may be that some participants in one group were more educated and therefore better problem solvers, and this is an extraneous variable that is affecting the dependent variable (outcome).

With research studies you will be presented, you can almost always find arguments to highlight extraneous variables in some form. It is handy to get into the habit of recognising these different forms as they prove useful in critically analysing studies and topping up your points with further evaluation marks, especially if you go on to study A-level psychology.

Sampling Methods

For the different types of sampling methods, the GCSE psychology specification states you need to know the following:

- Random sampling
- Opportunity sampling
- Systematic sampling
- Stratified sampling
- Strengths and weaknesses of each sampling method
- Understand principles of sampling as applied to scientific data.

This section of AQA GCSE psychology requires you to know about 4 different sampling methods and their strengths and weaknesses.

Sampling methods are merely the different strategies researchers use to get participants for their studies. In any psychological research study, there is usually a target population, which is the group of individuals the researcher is interested in. The aim of the researcher is to try and take a representative sample from this target population using a sampling method. The goal is to gain a representative sample that then allows the researcher to make generalisations across the whole population, based on the findings of this sample.

The four sampling methods you are required to know about are:

- **Random sampling**
- **Opportunity sampling**
- **Systematic sampling**
- **Stratified sampling**

Random Sampling

Random sampling involves the researcher identifying members of the target population, numbering them and then attempting to draw out the required number of people for their study.

The selection of participants can be done in a randomised way such as drawing out numbers from a hat if the sample size is small or having a computer randomly select the participants if the sample size is large.



Strengths and Weaknesses of Random Sampling

- Random sampling has the benefit of being more unbiased as all members of the target population have an equal chance of being selected for the study. This would mean that the sample is likely to be more representative of the target population making more valid generalisations possible from the research findings.
- Random sampling also means there is less chance that researchers can influence the results as they have no say as to who is picked. This reduces the impact of investigator effects which means the findings may have more validity.
- However, even despite this, it is still possible for the researcher to end up with an unbalanced and biased sample by chance, particularly if the sample size is too small.
- Gathering randomised samples can also be time-consuming, as attempting to gather enough willing participants from the target population takes a considerable amount of time and effort.

Opportunity Sampling

Opportunity sampling is a form of sampling method that means you ask those who are around you and most easily available, that represent the target population, to participate in the study. This may involve asking those around you in your class, school or people walking in the street for their involvement.

Strengths and Weaknesses of Opportunity Sampling

- The main benefit of opportunity sampling is it is one of the fastest and easiest ways to gather participants for a study when compared to other sampling methods.
- Opportunity samples have a greater chance of being biased because the sample is drawn from a very narrow part of the target population. For example, if you selected participants at school, your sample is likely to consist of mostly students and the behaviours they display in the study may not generalise to adults. Participants may also try to “help” the researcher in a way that would support the hypothesis so the results may be unreliable and invalid.
- With opportunity sampling methods, it is possible the researcher can influence those selected as the process is not randomised. The researcher may select the people they think will support their hypothesis, so investigator effects is a potential hindrance.

Systematic Sampling

Systematic sampling involves selecting every “nth” member of the target population. An example of this would be if the researcher decided that “n” will be “5”, every 5th person in the target population is selected as a participant.

This is still unbiased as the researcher has no influence as to who is picked and it is technically not a “random sample” either as not everyone gets an equal opportunity to be selected (it is only the person 5 positions away). Be sure not to confuse this with the random sampling method due to this slight difference; just remember that there is a fixed systematic way for selection that determines this to be a systematic sample.

Strengths and Weaknesses of Systematic Sampling

- A strength of the systematic sampling method is that it is a simple way for researchers to gather participants and there is little risk of research bias influencing this. Therefore the participants gathered should, in theory, be representative and unbiased which should lead to more reliable results.
- A weakness, however, is participants gathered could still be unrepresentative and biased due to chance selection. This would make the results unreliable when re-tested.
- Another weakness of systematic sampling is you need a bigger sample size to be able to filter out participants based on the “nth” selection. If you require 100 participants for a study and picked them based on every 10 participants, you would need 1000 participants to filter through. Therefore gathering participants for a study based on systematic sampling methods can be very time-consuming.

Stratified Sampling

Stratified sampling is the most complex of the sampling methods and it is most often used in questionnaires. Sub-groups (or strata) within the population are identified (e.g. boys and girls or age groups: 10-12 years, 13-15 years etc) and then participants are gathered from each strata in proportion to their occurrence in the population. The selection of participants is generally done using a random technique.

For example, in a school, there are several subgroups such as teachers, support staff, students and other staff. If the teachers made up 10% of the whole school's population, then 10% of the sample must be teachers. This is then repeated for each sub-group.

Strengths and Weaknesses of Stratified Sampling

- A major strength of using stratified sampling techniques is that they are very representative of the target population. This means the findings should have high reliability and validity to make generalisations to the target population.
- A major weakness of using stratified sampling is that it is very time-consuming to identify the subgroups, select necessary participants and attempt to get a proportionate sample involved in the study. Therefore this form of sampling method is extremely difficult to execute and can be impractical.

Volunteer Sampling

A volunteer sample consists of people that have volunteered to take part in the study. Volunteers can be gathered in a number of ways such as putting an advert out on the newspaper, internet or some media outlet to try and gather people to take part.

Volunteers may put themselves forward to be part of the study but they may not necessarily be told the aim of the study or what they are really being tested in. For example, Milgram's shock study gathered volunteers who agreed to take part but did not necessarily know what they were being tested on (obedience).



Strengths and Weaknesses of Volunteer Sampling

- A strength of using volunteer sampling is participants should be willing to give their informed consent to be a part of the study. The people that tend to volunteer tend to be those motivated to take part in the study.
- Volunteer sampling can also be a fast and efficient way of gathering research participants. Instead of having to search for volunteers, an advert could be placed to gather participants based on the traits/characteristics the researcher requires.
- A weakness of using volunteer sampling is the people that tend to volunteer may be a biased sample that are not representative of the target population. For example, volunteers are already motivated to engage in the research (volunteer bias) and more motivated than those that do not and this can influence the outcome of the study in some way.

Designing Research

This section on designing research for GCSE psychology and research methods is quite extensive and requires you to know about quite a few different aspects of designing psychological research studies.

The topics you need to know for research methods include:

- The experimental method including:
 - Independent group design
 - Repeated measures design
 - Matched pairs design
 - Strengths and weaknesses of each design
- Laboratory experiments
- Field and natural experiments
- Interviews
- Questionnaires
- Case studies
- Observation studies
- Strengths and weaknesses of each research method and types of behaviour for which they are suitable.

Independent Group Design



An independent group design is the simplest to understand and conducted with participants involved in the study usually divided into two subgroups.

One group will take part in the experimental condition (with the independent variable introduced), while the other group would not be exposed to this and form the control group for comparison.

Let's use the example we mentioned earlier with a study that measures the effects of music on learning.

In an independent group design, one group of participants would be measured on their ability to learn with music being played while the other group would be tested on their learning ability without music.

The results (dependent variable) are then compared between the two groups to measure the effects.

If the results are significantly different then researchers may conclude that this is because of the independent variable, which in our case would be music affecting learning ability.

Strengths and Weaknesses of Independent Group Design

- A strength of using independent group designs is there are no order effects that can invalidate the results, as participants only take part in one of the conditions. Order effects are apparent in experiments where repeated measure designs are used and this involves participants learning or improving from their experience of having to do the experiment more than once. This does not happen in independent group designs which can give more valid results.
- Independent group designs are beneficial as the materials or apparatus can usually be used across both the experimental condition and the control group (minus the independent variable being manipulated or introduced as required). This makes setting up independent group designs far easier than other experimental conditions due to saving time.
- Another strength of independent group designs is that participants are less likely to display demand characteristics. Demand characteristics are when participants change their own behaviour as they figure out (or think they do) the purpose of the study. The participants may then display behaviour that is different in response which can invalidate findings. Demand characteristics are less likely in independent group designs as participants are only exposed to one condition and they don't have the opportunity to learn or adjust their behaviour in another condition (as they cannot compare).
- A weakness of independent group designs is that differences between the experimental condition and control group may be due to participant variables, such as individual differences between the two groups, rather than the independent variable. Just by probability or chance, one group may be smarter than another or have individual characteristics that make them more able (or less able) for the condition they are exposed. This would then be a confounding variable that affects the results. Using the music example mentioned previously, the group that performs best (whether its the group exposed to music or not) may do so simply because they have more educated or intelligent people than the other condition.
- Another criticism of using independent group designs in experiments is that you need to gather more participants. For example, you need a large enough sample to be exposed to the experimental condition to make generalisations but you then need to gather this number again for the control group condition. Using our example earlier, if we wanted to test how music affects people's ability to learn and we gather 50 people, we need another 50 people for the control condition that is exposed to no music. Gathering too few participants increases the risks of individual differences being the difference in results while gathering a large number requires more time, effort and resources.

Repeated Measures Design



A repeated measures design sees all the gathered participants of the study being exposed to both conditions of the experiment.

Referring to our music and learning scenario (once again!), we would have a group of 50 participants that would first be exposed to the experimental condition whereby they attempt to learn with music present and then they would attempt to learn without music.

The results would then be compared between the conditions to assess what impact the IV had on the DV.

In experiments where there were numerous different conditions, the same participants would be used across them while exposed to different independent variables.

Strengths and Weaknesses of Repeated Measures Design

- A major strength of repeated measure designs is that they require less effort to gather participants as they use the same people across the different experimental conditions. Therefore setting up the experiment tends to be faster compared to group designs such as independent measures where you would require double the amount of participants to cross-compare against.
- Another strength of using repeated measure designs is participant variables are eliminated. This is because the same people are used across the different conditions and they are comparing against themselves directly. This means there is less chance of individual differences influencing the results.
- A weakness of using repeated measure designs is that there is a high risk of order effects affecting the validity of findings. As participants are required to do multiple tasks across different conditions, there is the risk that participants may improve as they repeat the experiments. For example, if they were tested on their learning ability while music was played in one condition, when they are tested without music, the experience and practice gained from the first condition may see them improve. Researchers may then incorrectly view this improvement as due to the independent variable (IV) rather than order effects.
- Another criticism of using repeated measures is you need to create multiple different tasks or materials between the conditions. For example, you could not use the same content for participants to memorise from one condition to another in a memory test experiment. You would need to create content that was judged to be similar in difficulty which in itself would be a subjective measure. For example, having participants memorise 20 “easy” words with similar syllables in one condition, would require a researcher to spend significant time and effort in creating another set of similar words for another condition.
- There is a higher risk of demand characteristics when using repeated measure designs. This is because participants may be able to guess the purpose of the study (if it is intentionally obscured to improve the validity of findings) and then adjust their behaviour accordingly. This is more likely to happen as the same participants are used across the different conditions and they may notice the different setups and the purpose of the study. This may lead to invalid findings from the behaviour that is observed.

Matched Pairs Design

A matched pairs design involves gathering participants and testing them prior to them taking part in the study on certain characteristics. The tests allow them to be matched in pairs with someone who is deemed to have similar qualities as to them which may be relevant to the study.

The pairs may be identified as Pair Aa or Pair Bb etc.

In conducting a matched pairs design research study, one pair will take part in one experimental condition while their matched partner/pair is exposed to another experimental condition.

The results are then compared by the researcher between the conditions and treated as if they were gathered from one individual despite coming from two individuals.

Within psychological research, the most ideal matched pairs participants tend to be identical twins as they account have identical biology (as they are similar) and potentially very similar personality factors too.

Strengths and Weaknesses of Matched Pairs Design

- One strength of using matched pairs designs in research is they reduce participant variables which can affect the results. This is because the people are paired up together based on similar traits that are relevant to the study.
- Another strength of using matched pairs is that there are no order effects, unlike repeated measure design studies. This is because everyone does the experiment once and have no opportunity to learn from their previous attempts.
- Matched pairs designs can re-use the same materials/apparatus across the pairs as everyone will only be exposed to them once. This makes the setup of the experiment easier as researchers do not have to create unique set-ups across the two groups which can be time-consuming.
- A weakness of using matched pairs design is matching people on key variables is time-consuming and not always successful. Attempting to find people who can be matched requires an initial large sample to filter through and this can take a very long time to do.
- It is difficult to match people based on personality variables or filter out individual differences for certain. You can generally only match people based on fixed traits such as gender (sex), age, height etc, however, personality factors may be what determine differences in the experiments. Therefore matched pair designs can produce invalid results that are not the result of the independent variable.

Laboratory Experiments

Laboratory experiments are experiments that are conducted in a controlled setting, usually a research laboratory where participants are aware of being observed and part of a study.

Laboratory experiments tend to have high internal validity because researchers can control all the variables so the main differences between the experimental condition and control group are only the independent variable whose effect is being monitored. This allows researchers to more confidently assume that any differences between the conditions are due to the independent variable.

Strengths and Weaknesses of Laboratory Experiments

- A major strength of laboratory experiments is they have high validity. This means that researchers can be confident to a higher degree that what they are measuring is in fact due to the effect of the independent variable because this is the only difference between the experimental condition and control group.
- Another strength of using a laboratory setup is this limits the role of extraneous variables from influencing the results as researchers have complete control of the environment. This means unaccounted for outside influences are limited and makes drawing cause and effect between the IV and DV more reliable.
- Laboratory experiments can be checked for reliability as they are easier to replicate. Due to the artificial setup of the experiments (being in a laboratory setting), other researchers can recreate the experiment exactly to check the results for reliability. This can be harder to do with other setups.
- A weakness of using laboratory experiments is they lack ecological validity. This is because the setup of the experiment is artificial and in a completely controlled environment and the results gathered in the lab, may not generalise to real-world situations due to their contrived setup. Therefore laboratory experiments tend to lack ecological validity as the setup involved to test behaviour may not occur similarly in real life e.g. testing memory ability and learning in a lab setup is unlikely to be how people learn with or without music being present – or using a film clip to test eyewitness testimony is not realistic.
- Participants in laboratory setups may display demand characteristics and adjust their behaviour due to the contrived setup and being aware that they are being observed. Therefore the behaviour observed may lack validity as it may not be indicative of how people are likely to behave in the real world if they think they are not being observed or under supervision. Participants may, therefore, behave how they think researchers want them or what would be deemed normal with others watching, not necessarily what they would actually do.

Field Experiments

A field experiment is conducted in a more natural or everyday environment, unlike the laboratory experiment where the behaviour being measured is more likely to occur.

The field experiment can be conducted anywhere in real-world settings with researchers manipulating an independent variable to measure its impact on the dependent variable. A field experiment can include confederates that participants are unaware of also being involved to test their response in the field setting.

One key difference between a field experiment compared to a laboratory experiment, are participants may not be aware of being observed or studied. This is in an attempt to generate more realistic behaviour or responses from them that can generalise to real-world settings.

Strengths and Weaknesses of Field Experiments

- A strength of using field experiments is they are high in ecological validity as the setup and environments are more realistic. This is thought to increase more realistic responses from participants as they are not always aware of being observed (unlike lab settings). The argument here is field experiments have higher internal validity and the behaviours from participants can then be generalised to the wider population.
- A weakness of using field experiments is they are at higher risk of extraneous variables influencing the behaviour of participants. Researchers, therefore, have less control and cannot say with as much certainty that the behaviour they observed was in fact due to the independent variable or not.
- Another criticism of field experiments is they are difficult to replicate. Participants may be members of the public with personality factors that influence the results which are unaccounted for and the environment itself may be difficult to recreate in order to test the study for reliability in its findings. Therefore replication and reliability become an issue for field experiments.
- Another weakness of using field experiments is they raise ethical issues in regards to informed consent. This is because participants may be unaware of being observed or part of a study and this raises ethical concerns. On the other hand, this may also provide us with more realistic and valid results without demand characteristics being a potential confounding variable.

Natural Experiments

A natural experiment is conducted when ethical or practical reasons to manipulate an independent variable (IV) are not possible. It is therefore said that the IV occurs 'naturally'.

The dependent variable (DV), may however, be tested in a laboratory, for example, the effects of institutionalisation in some form, which may occur naturally due to imprisonment or disruption of attachment through the care system and how it may affect psychological development such as intellect or emotional development.

Another good example of a natural experiment is the study by Charlton et al. (2000) which measured the effects of television. Prior to 1995, the people of St. Helena, a small island in the Atlantic had no access to TV however its arrival gave the researchers to examine how exposure to western programmes may influence their behaviour. The IV in this case was the introduction of TV which was not controlled by researchers and something they took advantage of would be practically difficult to control. The DV was measures of pro or anti-social behaviours that were assessed through the use of questionnaires, observations and psychological tests.

These types of experiments would either impractical or unethical to implement and therefore cases where this occurs naturally due to normal circumstances may be examined through natural experiments.

Strengths and Weaknesses of Natural Experiments

- One major weakness of natural experiments is the lack of control. It is more difficult to control extraneous variables which makes it difficult to establish causality.
- A strength of natural experiments is they are high in ecological validity. Due to the 'real world' environment, the results relate to everyday behaviour and can be generalised to other settings.
- Another strength of natural experiments is they often produce no demand characteristics as the participants are unaware of the experiment. Therefore the behaviour observed is more likely to be realistic and indicative of behaviour that can be generalised across wider populations.
- A weakness of natural experiments is they are difficult to replicate to double check the findings. As the conditions are never exactly the same, it becomes difficult to establish reliability in such experiments which then affects validity as causality cannot be determined.
- Participants are often not aware of being observed or taking part in natural experiments and this raises ethical issues, in particular, informed consent. They may not wish to take part or be monitored and this is another weakness of natural experiments, although they may be debriefed after the experiment and given the option of giving consent to use the data collected from them.

Interviews

One way psychologists find out about people's behaviour is to quite simply ask them through the form of interviews.

Interviews involve a researcher in direct contact with the participant and this could either be face to face or via phone/video call. The vast majority of interviews involve a questionnaire that the researcher records the responses on at the time of the interview. There are different forms of interviews used which vary in structure and we will look at specifically structured and unstructured interviews for GCSE psychology.

Structured Interviews

Structured interviews involve all participants being asked the same pre-set questions in the same order. The researcher is unable to ask additional questions outside of this.

The questions are often closed questions that require a yes or no response, or they can be open questions that simply require the researcher to record the participant's response.

Open questions can be questions that begin with who, what, where, when, why and how.

These force a participant to explain their answers beyond simply saying yes or no.

Strengths and Weaknesses of Structured Interviews

- Structured interviews can be replicated far more easily than unstructured interviews as the questions are all pre-set. This helps in testing the reliability of research findings to check for consistency and validity in the conclusions drawn.
- A criticism/weakness of using structured interviews is they can be incredibly time consuming and require skilled researchers. People's responses can also be affected by social desirability bias.
- Structured interviews gather quantitative data but lack qualitative data. When participants can only answer yes or no, this does not tell us why they think or respond this way which may be more important to understand behaviour.

Unstructured Interviews

In unstructured interviews, participants are free to discuss anything freely. The interviewer may devise new questions as the interview progresses or on the previous answers given, to explore further.

With unstructured interviews, each participant is likely to be asked different sets of questions within the interview. The questions asked in unstructured interviews may be a mix of open and closed questions.

Strengths and Weaknesses of Unstructured Interviews

- Unstructured interviews provide rich and detailed information however they can not be replicable and people's responses cannot be easily compared.
- Unstructured interviews have the benefit of allowing participants to explain their responses which can help us understand why they think or behave in particular ways which may be more valuable than structured interviews telling us merely how they would behave.
- Unstructured interviews can be more time-consuming as there is no structure or guideline to follow in regards to how many questions are being asked. They also require more trained interviewers who are able to articulate themselves and the questions they wish to ask, unlike structured interviews which can merely be read from a list and explained more easily.

Questionnaires

Questionnaires are an example of a survey method that are used to collect large amounts of information from a target group that may be spread out across the country.

The researcher must design a set of questions for participants to answer; people taking part in a survey are referred to as "respondents" because their answers or behaviours are in response to the questions presented. Questionnaires can be conducted face to face, via phone or video call too.

Questionnaires are similar to structured interviews as respondents all answer the same questions, in the same order and they often narrow the possible responses to closed questions (yes or no answers).

Strengths and Weaknesses of Questionnaires

- Questionnaires are practical ways for researchers to gather large amounts of information very quickly on topics where the responses are best suited for yes or no responses.
- Another strength of using questionnaires is that they can be replicated very easily as all the questions are pre-set. Responses can be gathered again to check for reliability and validity this way far more easily.
- Problems arise in the use of questionnaires when the questions are unclear or if they suggest or lead respondents into a desirable response. Responses can be affected by social desirability bias so participants may not necessarily answer truthfully which can invalidate findings.
- Another criticism of using questionnaires in research is respondents can only answer yes or no. This limits the amount of information that can be gathered but also participants may not be able to answer in certain terms yes to every presented scenario (or no). It may be that their responses only represent given situations but can be different in other situations.
- Respondents may misunderstand the meaning of questions and therefore answer incorrectly. Unlike structured interviews that allow participants to ask questions to clarify their understanding, respondents may misread or misunderstand questions and answer in a way that is not truly representative of their views.
- The researcher needs to make sure that in writing the questions, they are clear and unambiguous. This can be a difficult task to achieve and requires a great deal of time to construct questions that do not bias or lead the respondents into responses.

Case Studies

A case study is a very detailed study of the life and background of either one person, a small group of people or an institution or an event. Case studies use information from a range of sources, such as the person concerned, related family members or even friends.

Various techniques may be used such as interviewing people or observing people as they engaged in daily life. Psychologists may also use various tests such as IQ tests, personality tests or some questionnaire to produce psychological data about the target in question.

Researchers may also refer to school or work records for an individual or carry out observations of the individual or groups in question. The case study is then written up as a description of the target individual or group and interpreted information based on psychological theories.

Case studies tend to be longitudinal and follow the target over a long period of time (often many years).

Strengths and Weaknesses of Case Studies

- A strength of using case studies is they provide detailed information about individuals (or target group/institution) rather than collecting a score on a metric test from a person.
- Another benefit is case studies collect information over a long period of time so changes in behaviour can be observed and comparisons are drawn over this period to understand the changes.
- A weakness of using case studies is they target a single individual and this makes it difficult to generalise the findings to others. The situation or factors that influence this individual's outcomes may not necessarily do the same for others due to individual differences. The data collected is also very subjective as it relies on usually peoples perceptions of things and their memories may not be so reliable over such a long period of time. There is also the risk that the researcher themselves projects their own biases onto the findings and makes their own interpretations of the content making the case study unreliable.
- There can be ethical concerns with using case studies as the people or group being followed are usually of interest because of some psychological problem. This could make them vulnerable and raise ethical concerns about whether they can give informed consent.

Observation Studies and the Observational Method

In an observational study, the researcher watches or listens to the participants engaging in whatever behaviour is being studied and records their behaviour. In most natural observations, people are observed in their normal environments without interference from the researcher.

In some studies, a researcher may cause something to happen to gauge the responses of people and record these.

Here's an example of one such study:

A nurse is called by a "doctor" via telephone and instructed to give medicine to a patient which is against the rules.

The study was conducted in the nurses natural setting of the hospital and researchers then observe whether the nurse follows this instruction or not.

In some studies, the data may also be collected in a "laboratory setting" although this may not necessarily be a laboratory. This may be a natural setting that has been organised by the researcher to make it easier to observe the targets.

Strengths and Weaknesses of Observation Studies and the Observational Method

- What people say is often very different from what they may do in a given situation. The observational method is high in ecological validity and its use is very suitable for social behaviours as it allows researchers to gauge peoples true responses. If participants were asked about their behaviour prior, they may give socially desirable responses which may not be what they would really do and observational studies allow us to see true behaviour without this bias.
- The behaviours observed in observational studies have higher external validity as they can be more easily generalised. Unlike laboratory studies that test participants under contrived circumstances (e.g. memorising lists of words to test memory), observational studies and their setup are more natural providing more ecologically valid results.
- A weakness, however, is although researchers see and record behaviour in an observational study, they do not know why the behaviour happened. This then requires the researcher to make a judgement on its cause which may be riddled with bias or may simply be incorrect.
- Participants or subjects may become aware of being observed and thus change their behaviour leading to researchers recording incorrect responses. Also, the researcher themselves may make a mistake recording the behaviour which can invalidate findings.
- Observational studies also raise ethical issues particularly around informed consent as participants are usually not aware of being observed or part of a study. Informing them prior may lead to their behaviour altering when they are aware of being observed however not informing them raises ethical issues of privacy and lack of consent.

Categories of Behaviour

In order to make sure that accurate records of behaviour are made, researchers use categories of behaviour systems.

If researchers wanted to observe “playground behaviour”, researchers would not necessarily know what they were looking for in this definition or what may be classified as “playground behaviour”. The observers would need to know what they are looking for to make accurate recordings and therefore **behavioural categories are created to make it clear what behaviours are to be recorded.**

Inter-observer reliability

When an observation study is conducted, observers record the number of times certain behaviours occur (usually in the form of a tally chart).

This record of the number of incidents for the different behaviours needs to be accurate and ensure that the observer is recording the correct behaviour within the correct categories.

In observation studies, observers may miss the behaviour and so accuracy of recording the behaviour becomes an issue as it cannot be seen again in live environments. A solution to this problem is to design a record sheet with the pre-defined suitable behaviour categories and then have two observers independently observe the targets at the same time and location. Each would then record what they see in their own individual sheets independently from the other.

At the end of the study, the observers may compare their record sheets to check for consistency. If the sheets have been recorded correctly, they should have matching or very similar recordings of their observations. If this occurs, they have established inter-observer reliability. If the record sheets are considered vastly different, this would mean the study lacks inter-observer reliability and the results lack validity as they are not measuring what they are supposed to measure accurately.

What is a correlation?

A correlation is quite simply a relationship between two variables. There are 3 types of correlations which are:

- **Positive correlation,**
- **Negative correlation**
- **Zero correlation**

With positive and negative correlations, the relationship is seen as a “cause and effect” relationship whereby one variable has a direct impact on the other. Correlations form part of a statistical technique to analyse and display the possible relationship between the two variables.

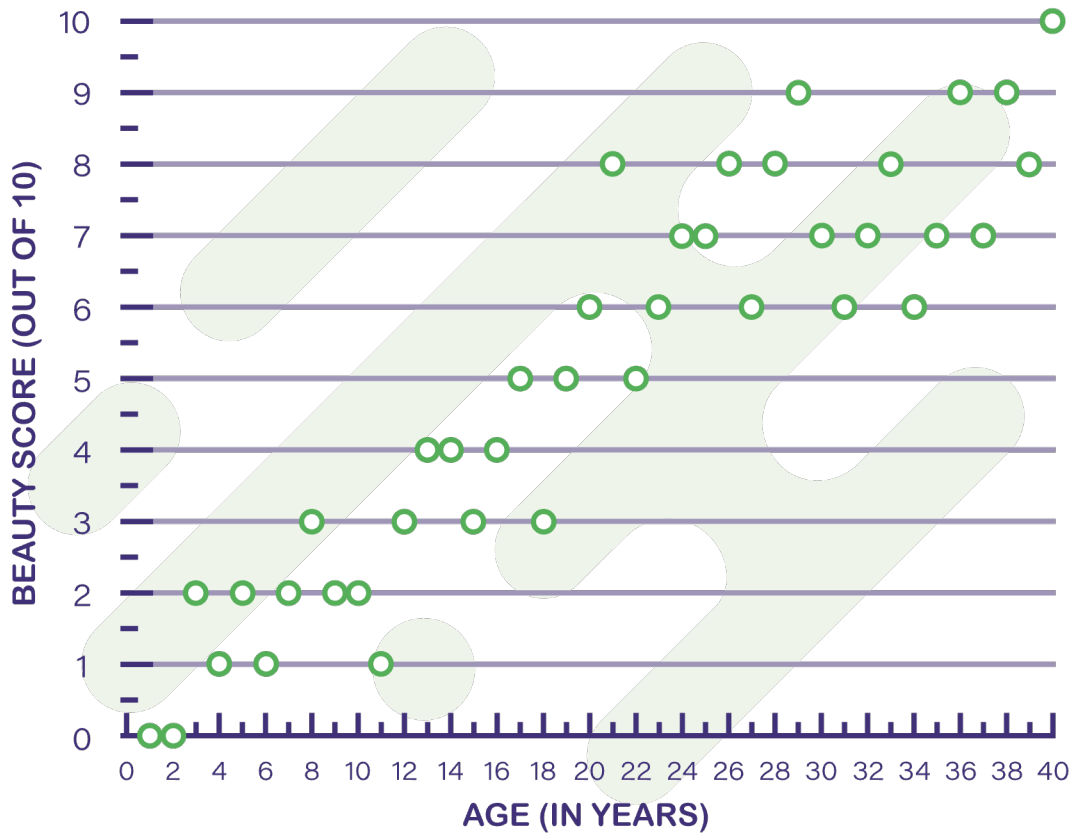
Let's work through a few subjective examples for each: Let's assume there is a correlation (relationship) between the two variables age and beauty. As people get older they may be seen to be more beautiful. This would be considered a positive correlation because both the variables increase together.

If however people disagreed and thought that as people age and get older, they are less beautiful, this would be a negative correlation. This is because as one variable increases, the other one decreases which in our case would be age increasing while beauty decreases.

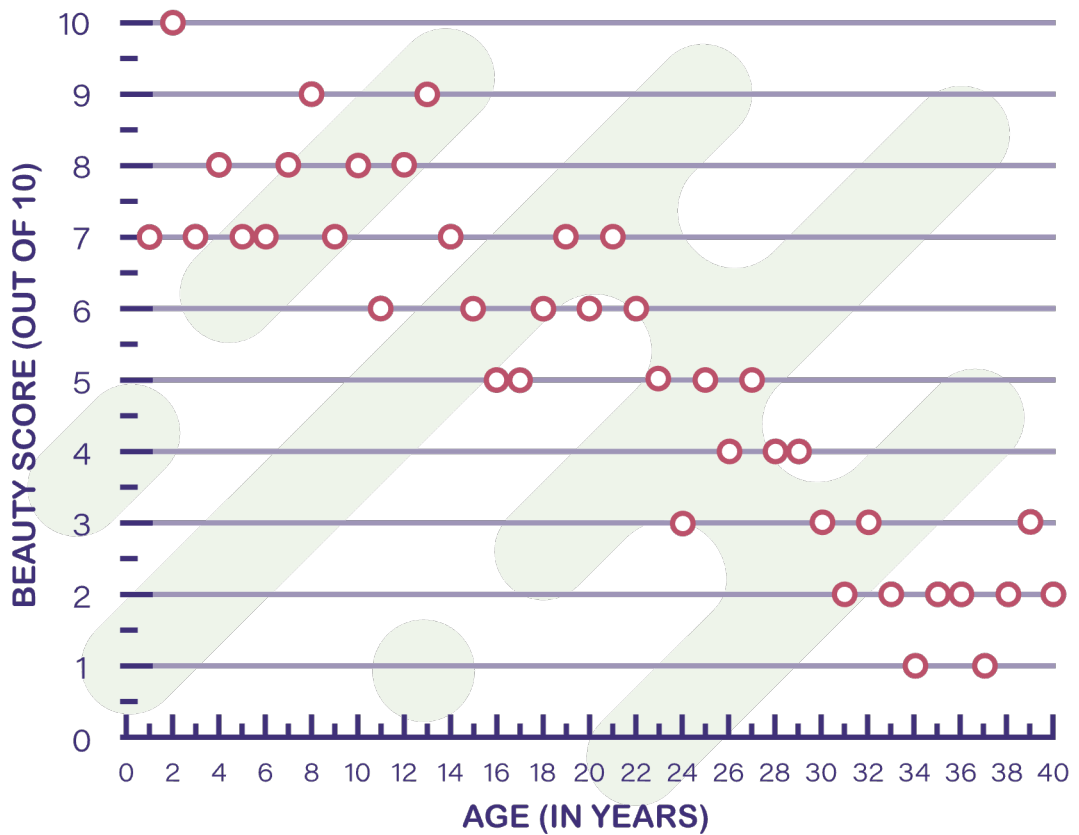
The third way of looking at this is thinking that age has no effect on perceived beauty. As people get older you may think this has no bearing on a person's beauty so the two variables would be seen as having zero correlation.

Below we have some examples of scattergrams that give you an idea of how each correlation would look if presented to you. You may sometimes be asked to draw a line of central tendency too within a correlation; all this means is you draw a line down the middle of all the correlations with equal amounts on either side of it.

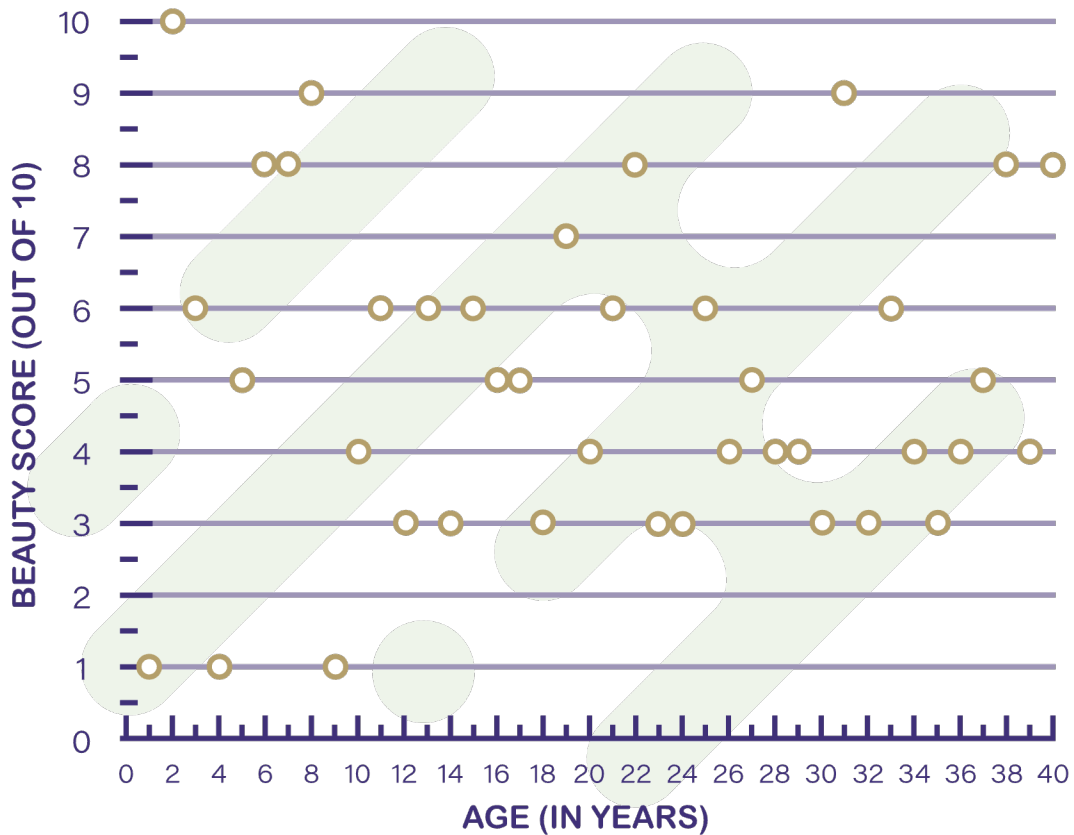
POSITIVE CORRELATION



NEGATIVE CORRELATION



ZERO CORRELATION



Strengths and Weaknesses of Correlations

- Correlational research can be very useful as they allow a researcher to see if two variables are connected in some way. Once a relationship has been established between two variables, a researcher can then use an experiment to try and find the true cause of the correlation.
- Correlational research can be used in situations where it may be unethical or impossible to carry out an experiment. For example, if we wanted to check for the relationship between smoking and cancer, this would be unethical to test (asking people to smoke to see if they develop cancer). However, plotting the rates of cancer developing in people who already smoke can help us establish links between these two variables. This knowledge can then be helpful in influencing future research.
- A weakness of using correlations is although this type of tool can tell us if two variables are related, it does not tell us which of the two variables caused the relationship. It is also possible that there may be third unknown variables that lay in between and influence the two we measure in research which may be the actual cause.
- For correlational research to be helpful, we first need to gather large amounts of data to establish the pattern in the scatter graph. This means researchers are required to make lots of measurements of both variables so that the patterns in the data can be reliably established. Using correlational research for small populations is not reliable so it can be very time-consuming establishing a large data set.

Research Procedures

What the GCSE Psychology specification says you need to learn for this section on Research Procedures:

- Standardised procedures
- Instructions to participants
- Randomisation,
- Allocation to conditions
- Counterbalancing
- Extraneous variables (including explaining the effect of extraneous variables and how to control for them).

Standardised Procedures

When conducting experiments, researchers need to ensure that standardised procedures are used.

Standardised procedures are a set of sequences that apply to all the participants when necessary to ensure the experiment is unbiased. Standardised procedures allow the researcher to try and control all the variables and events so the results of the experiment can be safely attributed to the independent variable.

Instructions to Participants

When standardising procedures, another issue researchers need to be mindful of is how instructions to participants are put across to make sure they know what to do but without biasing the study in any way. This can include verbal and written instructions.

Instructions can be interpreted in a way that can influence their performance and these can become extraneous variables. For example, if instructions were worded with leading questions, this may cause participants to answer in one particular way. If instructions are ambiguous, this can also affect the results of the study.

To address this issue, the usual practice is to write as much information as possible for participants and ensure they all receive this same information. This is usually done in sections as follows:

- **Briefings:** this is where participants are encouraged to participate with a log of what is discussed to gain their consent. This can include ethical information about consent, anonymity, the right to withdraw etc.
- **Standardised instructions** are given: these are clear instructions given to each participant explaining their role and what they need to do.
- **Debriefing:** at the end of the study, participants are given a detailed explanation about the aims of it, what their role was and why they were given their tasks or roles. Ethical issues are also raised again with participants given the opportunity to withdraw their data/contributions if they feel unhappy about their performance or participation.

Randomisation

Randomisation simply means to make sure there are no biases in the procedures.

Let's use our music and learning example again for a moment to highlight how randomisation may be implemented in a psychological study.

Participants are being tested on their ability to learn through the use of 20 random words they are presented with. All the words are considered to be of equal difficulty because they are everyday nouns with only six letters. The researcher has to decide which order they should be presented to each of the participants in the study however instead of the researcher determining the order, randomisation is used.

All 20 words are written down on a piece of paper and put into a hat. They are then randomly selected one after the other with their order being written down in which they have been selected. This order is then determined to be the order to which all participants will be exposed within the experiment.

Using randomisation, all the words had an equal chance of selection and now with an order established, all participants will be exposed to them in the same way. Randomisation can be implemented in a number of ways within an experiment to filter out biases and you may be given a question on how to best implement this or its benefits.

Another major issue researchers face, is how to allocate the participants to the experimental condition or control group.

To reduce researcher bias, two methods used are **random allocation** and **counterbalancing**.

Random Allocation

When the design of the study uses an independent group design, the researcher can use random allocation to avoid any potential researcher bias. Participants can be randomly selected in turns for either condition A or condition B by pulling their name out of a hat for example.

A similar method can be employed if the design of the experiment is a matched pairs design. Participants can be randomly allocated to their pairs by them pulling out the letters for each pair from a hat e.g. the two people who pull out A+a from a hat form a pair, the same with B+b, C+c etc and so forth.

Counterbalancing

For experimental designs such as the repeated measures design, all the participants are required to take part in the experiment for both conditions. The problem with this is that order effects can occur whereby participants learn from experience and thus do better in all the following conditions after their initial one.

Counterbalancing helps balance out order effects by splitting the group of participants into two groups. One half will then complete condition 1 while the other half complete condition 2.

After completing this, they swap and complete the opposite condition so those who completed condition 1, then move on to complete condition 2, those that completed condition 2, go on to complete condition 1.

Using counterbalancing does not get rid of order effects but allows for the effects of it to be balanced out equally between the two conditions for participants and thus providing more valid results.

Ethical Considerations

For Ethical Considerations, the specification states you need to know the following:

- Ethical issues in psychological research as outlined in the British Psychological Society guidelines
- Ways of dealing with each of these issues.

This next section focuses on all the ethical considerations based on the British Psychological Society guidelines and ways in which each can be dealt.

Ethical issues arise when there are two conflicting points of view;

- **One is what the researcher needs to do in order to conduct a useful and meaningful study**
- **The second is the rights of the participants which need to be considered.**

Ethical issues are therefore all the conflicts that arise about what is acceptable to do as part of the research.

As part of your GCSE psychology course, you need to be able to highlight ethical concerns and generate ways in which to deal with them. You may also be given a scenario where you need to highlight the relevant concerns and comment on how to deal with them.

The Code of Ethics and Conduct (2009) and Code of Human Research Ethics (2014) from the British Psychological Society underpin the activities of all practising psychologists.

What are the British Psychological Society Guidelines?

When research is conducted by any practising psychologist, The Code of Ethics and Conduct (2009) and Code of Human Research Ethics (2014) will underpin their work.

The British Psychological Society (BPS) guidelines explain what is required:

Respect

- Participants should be respected as individuals and unfair or prejudiced practices are to be avoided.
- The data collected should also be confidential and anonymised so participants cannot be identified from the research.
- Participants should have also given informed consent and know fully what they are consenting to. They should also be told at the beginning what the study is about prior to taking part.
- Deception must be avoided although the BPS recognises that some studies are not possible without this to gather meaningful results. Any deceptions that do take place must be explained to participants as soon as possible once the study concludes.
- They should also be aware of their right to withdraw from the study at any time.

Competence

Psychologists should maintain high standards in their professional work which includes:

- Being aware of the code of conduct
- Recognising that ethical dilemmas will inevitably arise and seeking to resolve them
- They should only give advice if they are qualified to do so and not trying to do things that are beyond their competence.
- Staying within the law if ethical principles conflict with the law but try to maintain the ethical principles as far as possible
- Monitoring their own health and lifestyle to recognise times when they may be unable to carry out their work competently

Responsibility

Responsibility within the British Psychological Society (BPS) is generally about avoiding harm to clients, avoiding misconduct that would bring psychology into disrepute and looking out for other psychologists that may be breaching these guidelines.

The BPS states researchers should:

"Consider all research from the standpoint of research participants, for the purpose of eliminating potential risks to psychological well-being, physical health, personal values, or dignity"

This can be done by:

Ensuring researchers protect participants from physical and psychological harm.

Making sure the risk of physical or psychological harm is no greater than what one would expect from everyday life and their wellbeing should not be at risk.

At the end of the experiment, participants should be debriefed at the end of the investigation so they fully understand the true aim of the study. This would then allow them to make an informed decision about whether they wish to withdraw their results.

Informed Consent

Informed consent means revealing to the participant the real aims of the study or telling them what will happen within the study. This becomes an ethical issue because revealing the true aims or details may lead to the participants adjusting their behaviour which could lead to invalid results.

For example, if we wanted to study whether people are more likely to obey a male or female as part of research into obedience, revealing the aims of this study will almost certainly affect their behaviour and invalidate findings.

Researchers may therefore not always give out the full details of the study however this means participants can not give their full informed consent. From a participants point of view, they should be told what they are required to do in the study so they can make an informed decision about whether they wish to take part.

This became a basic human right that was established during the Nuremberg war trials after the second world war. During the war, Nazi doctors conducted various experiments on prisoners without their consent and the war trials afterwards decided that consent should become a basic human right for participants to be involved in a study.

Epstein and Lasagna found that only a third of participants volunteering for experiments really understood what they had agreed to take part in despite giving informed consent. This demonstrates that even if researchers sought to and obtained informed consent, this does not always guarantee that participants understand what they are involved in or doing.

How to deal with ethical issues of informed consent

- Participants could be asked to formally indicate their agreement to take part based on information concerning the nature and purpose of the study and how their role fits in.
- Presumptive consent may also be gained; this can be done by asking a group of people whether they feel a planned study is acceptable and assume that the participants themselves would have felt the same if given the opportunity to say so.
- Researchers can offer the right to withdraw at any stage of the study to participants so if at any stage they feel uncomfortable or do not wish to continue, they can exit the research.

Deception

Some experiments require deception about the true aims of research otherwise participants might alter their behaviour and the study's findings become meaningless. A distinction could be made in some cases between withholding some details about the study (reasonably acceptable) compared to deliberately providing false information (less acceptable).

From the participant's point of view, deception would be unethical and thus they should not be misled without good reason.

An issue with deception is it prevents participants from giving informed consent. Participants may agree to take part without fully knowing what they have agreed to and become quite distressed by the experience. Baumrind (1985) argued that deception was morally wrong based on three generally accepted ethical rules within western society: the right of informed consent, the obligation of researchers to protect the welfare of participants and the responsibility of the researcher to be trustworthy.

Others have argued that deception can be harmless in some studies i.e. testing memory, and deception may be necessary to gain meaningful insights that would not be otherwise possible.

How to deal with ethical issues of deception

- The need for deception in research could be approved by an ethics committee which weighs up the potential benefits of the research, against the costs to participants.
- Participants should be fully debriefed after the study and given the opportunity to request that their data is withheld.

The right to withdraw

Participants would deem the right to withdraw from an experiment as important. If a participant begins to feel distressed or uncomfortable, they should have the right to withdraw from the study. This becomes more important particularly if they have been deceived about the nature of the study or their role.

From a researchers point of view, participants being able to withdraw midway through a study could bias the results in some way when comparing the results of those that stayed.

Within some experiments, participants are offered financial payments for completing the study and withdrawing is compromised because they may not get paid and thus feel like they can not withdraw.

Confidentiality

A researcher may find that maintaining confidentiality can be difficult as they wish to publish the findings. They may guarantee anonymity and withhold the participants' names, but even then it may be evident for some who the participants are.

In some locations or communities which are remote or the population is low, naming even the geographical area can identify the individual. The Data Protection Act makes confidentiality a legal right and it is only acceptable for a person's data to be recorded if it does not make it available in a form that can make the people identifiable.

To tackle this researchers should not record any names or personal details about the participants using numbers or fake names instead.

Privacy

Privacy may be difficult to accomplish from a researchers point of view, particularly when studying participants without their awareness.

Participants may feel that they should not be expected to be observed or watched by others in some situations e.g. within the privacy of their own homes although not when in public areas such as a park.

To tackle this researchers should not observe anyone without their informed consent unless it is in a public place where this may be expected to some degree. Participants could also be asked to give their retrospective consent or withhold the data entirely.

Data handling

What the GCSE Psychology specification says you need to learn for this section:

- Quantitative and qualitative data
- Primary and secondary data
- Computation
- Descriptive statistics
- Interpretation and display of quantitative data
- Normal distributions

There are two types of data research studies collect which are:

- Quantitative data
- Qualitative data

What is Quantitive data?

- **Primary data** is data that has been collected first-hand from the source (participants) directly by researchers. The majority of data collected in psychological research will be primary data.
- **Secondary data** is data that has been already published and simply used by researchers in their own work.

Strengths and Weaknesses of Quantitive Data

- Quantitive data tends to be objective and easy to measure for researchers.
- Precise measures are used,
- The data is high in reliability and can be checked through replication.
- The data can be more easily examined to check for patterns through the use of correlations and presented in the form of scattergrams.
- Weaknesses of quantitive data include the possibility that meaningful details could be lost or lacking as researchers focus on a narrow set of responses or pre-defined questions people answer.

What is Qualitative data?

Qualitative data is descriptive data that is non-numerical. This type of data provides detailed information which can provide insights into the thoughts and behaviours of individuals because the answers are not restricted to yes or no responses. For example, in an observational study, researchers may describe what they see and this would be deemed a form of qualitative data.

Qualitative data tends to be collected through the use of open questions (questions that begin with who, what, where, when, why or how) that encourage participants to explain themselves. This is done usually through questionnaires or unstructured interviews.

Qualitative data cannot be counted or quantified as easily although it can be placed into categories to count the frequency in which it is reported to occur. For example, we may be able to count how many times participants in Milgram's study reported being stressed or worried.

However as the responses from participants can be completely subjective to them, the data can be incredibly varied based on their responses and difficult to quantify or generalise with any meaning.

Strengths and Weaknesses of Qualitative data

- A major strength of qualitative data is it tends to be rich in detail.
- Another strength is qualitative data can help researchers understand peoples attitudes, thoughts and beliefs which may better explain their behaviour rather than them having to guess.
- A weakness of using qualitative data is it tends to be completely subjective.
- Qualitative data tends to also be an imprecise measure that is difficult to quantify.
- Another criticism of qualitative data is the difficulty in checking for reliability as participants all give subjective responses. This makes it difficult to generalise to other people.

What is Primary and Secondary Data?

- **Primary data** is data that has been collected first-hand from the source (participants) directly by researchers. The majority of data collected in psychological research will be primary data.
- **Secondary data** is data that has been already published and simply used by researchers in their own work.

What is the Mean, Median, Mode and Range?

There are **three types of averages that can be calculated from the raw data** obtained from studies which allow researchers to identify patterns in the behaviour.

These three are:

- **The mean average**
- **The median average**
- **The mode**

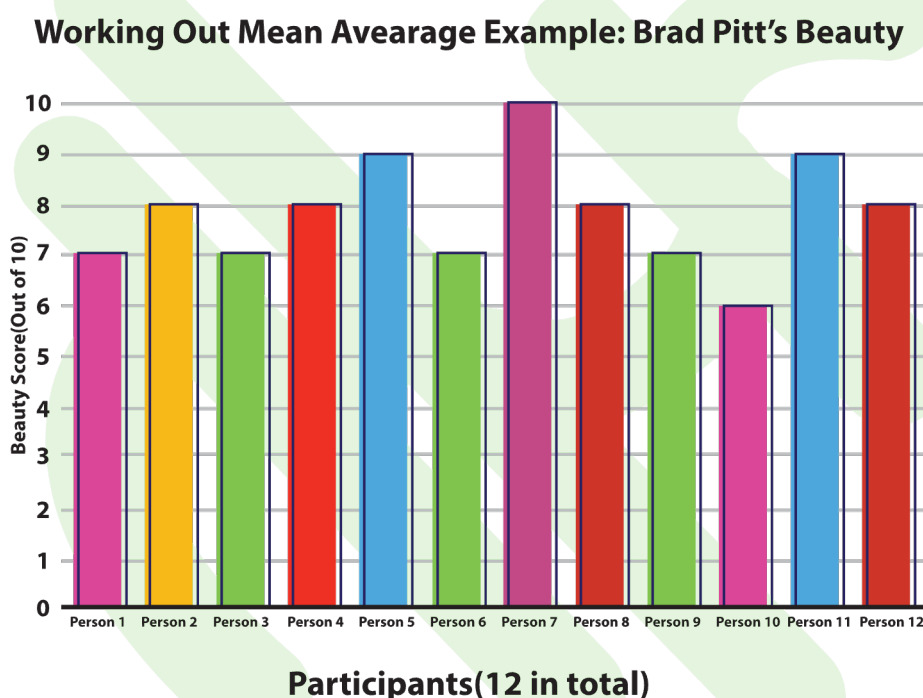
You can also work out the range although this is not an average.

The Mean Average

The Mean Average is calculated by adding together all the values in a set of scores and then dividing that number by the number of values in the set.

For example, if we wanted to work out the mean average for what Brad Pitts score would be on a beauty scale from us questioning 12 people, we would take their scores, add them up and then divide them by the number of people in the study (in our case, this would be 12).

Let's work through an example assuming that the beauty score is out of 10:



So to work out the mean average we would need to add up all the scores all 12 people have given – this would then be:

- a) $7 + 8 + 7 + 8 + 9 + 7 + 10 + 8 + 7 + 6 + 9 + 8 = 94$
- b) 94 is the total score of all 12 participants. We then divide this by 12 (the number of participants)
- c) $94 \text{ divided by } 12 = 7.83$

Brad Pitt's mean average score would be 7.83/10 (out of 10)

The Median

The Median is the **middle value** of a set of scores.

- To calculate the median you must arrange all the values in order from the lowest to the highest.
- Then you must find the middle value. If there isn't an obvious middle value due to an even number set, you work out the midpoint of the of the two middle values.

Let's work out the median value using the example above; we must first order the numbers from lowest to highest.

6, 7, 7, 7, 7, **8, 8**, 8, 8, 9, 9, 10

Having ordered the numbers we can see that the midpoint is 8 either side. Therefore the median in the example is 8.

The Mode

The Mode is the most frequently occurring value in a set of scores.

Sometimes there may be no mode (if no number occurs more frequently than another) or there can be more than one mode.

Let's work out the mode using the example above again by first writing down all the scores; we must first order the numbers from lowest to highest.

6, 7, 7, 7, 7, 8, 8, 8, 8, 9, 9, 10

We can see that the mode is 7 and 8 because they both appear the most which is 4 times.

The Range

The Range is the numerical difference between the highest and lowest set of scores.

So using our example above we can see that the highest score is 10 and the lowest score is 6.

We therefore minus 6 from 10 as follows:

$$10 - 6 = 4$$

The range is therefore 4.

Ratios, Fractions, Percentages

This section focuses on recognising and using expressions in decimal and standard form.

These include:

- **Ratios**
- **Fractions/decimals**
- **Percentages**

Ratios

A ratio is a way of comparing the amounts of something between each other and this is usually expressed in its simplest form.

If we had 15 boys and 12 girls in one class and we wanted to compare this as a ratio, this would be **15:12**

When we break this down into its simplest form this would be **5:4** because we can divide both sides by 3.

Fractions and Decimals

A fraction is a way of expressing a part of a whole number.

For example, if we had a group of 20 boys and 15 of those produced the action of running which we wished to express, the fraction would be **15/20 or 3/4 in its simplest form**.

As a decimal, this may be expressed as 0.75 as the total or whole amount is always represented as 1. The number of boys that did not express running would, therefore, be 0.25

Percentages

Percentages are a way of expressing a fraction of a hundred which is considered the full amount. So 50/100 would be expressed as 50% (percent). This is sometimes used in psychology to express how often something happens e.g. running occurred 75% of the time.

So using the example before, if we had a group of 20 boys and 15 of them were seen to be running and we wanted to work out the percentage of this, we could calculate it in the following way:

$$15 \times 100 \text{ divided by } 20 \text{ (total no. of people)} = 75\%.$$

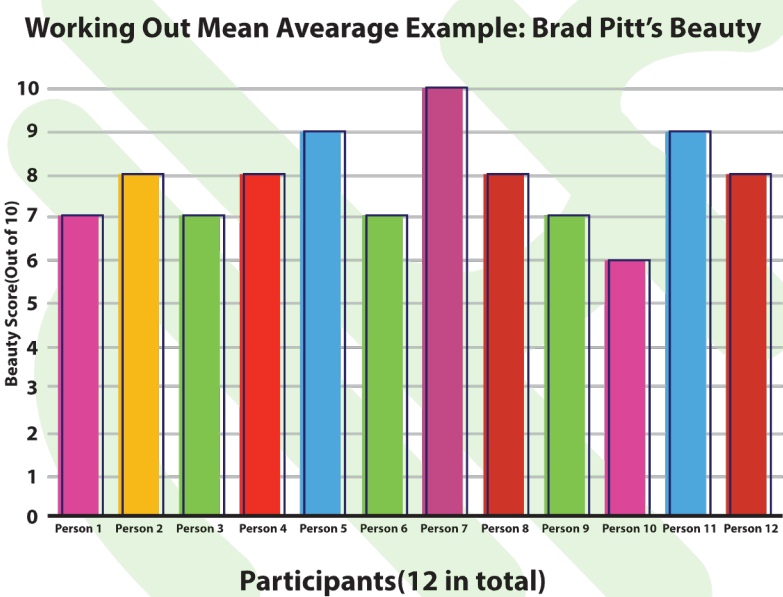
So to rephrase:

$$15 \text{ (boys)} \times 100 \text{ (the whole amount)} \text{ divide by } 20 \text{ (the total number of boys)} = 75\%$$

Bar Charts, Histograms and Scattergrams

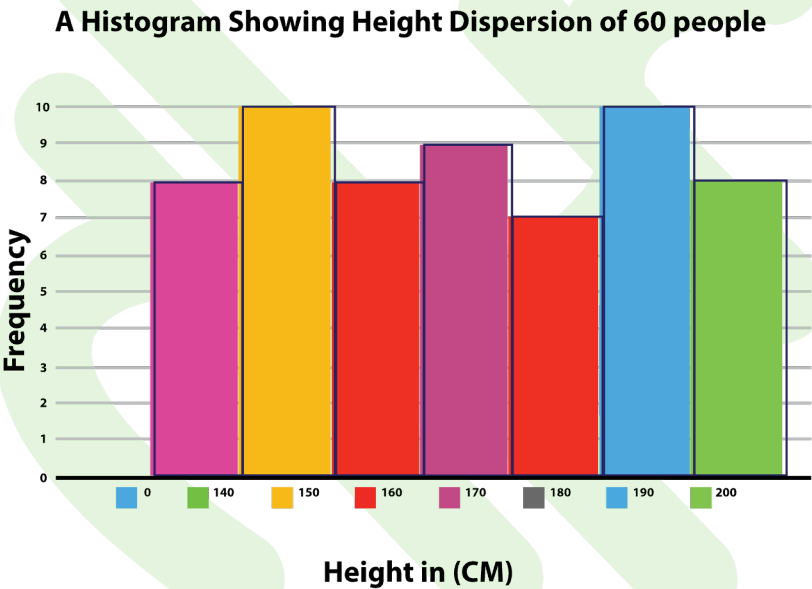
Bar Charts

Bar charts are used to display data that is in categories. Each bar represents a separate category with them labelled across the x-axis which is at the bottom (horizontal). The frequency or amount for each category is labelled on the y-axis which runs along the side (vertical). The bars drawn should not touch and be separated from one another. Here's a picture of the one we used earlier to measure the hypothetical study of beauty:



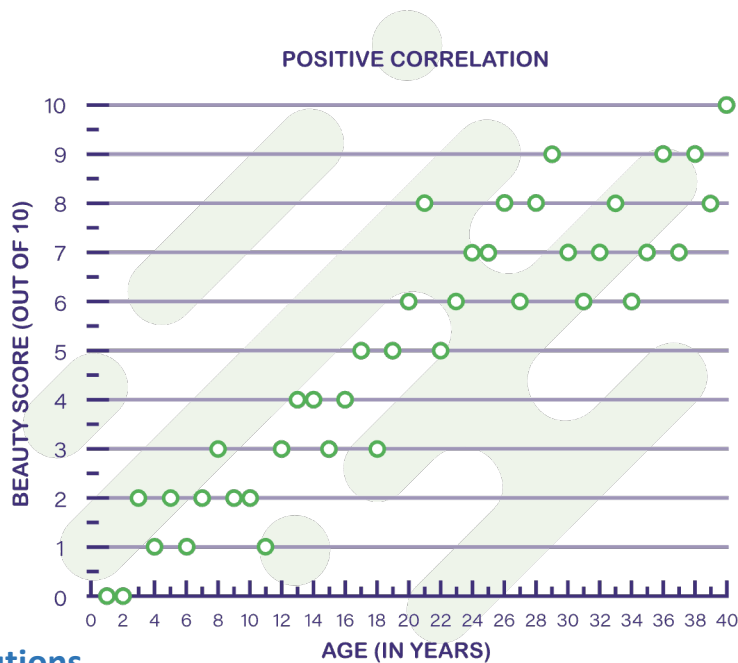
Histograms

Histograms are used to present data that are continuous measurements such as test scores or even height. The continuous scores are on the x-axis across the bottom and the frequency of these scores are on the y-axis. Histograms have no spaces between the bars (unlike bar charts) as the data is continuous. Here's an example below:



Scattergrams

We've already looked at scattergrams when discussing correlations earlier. Here is an example of a Scattergram showing a positive correlation below – notice how all the recording measure along an invisible line almost going diagonally across:

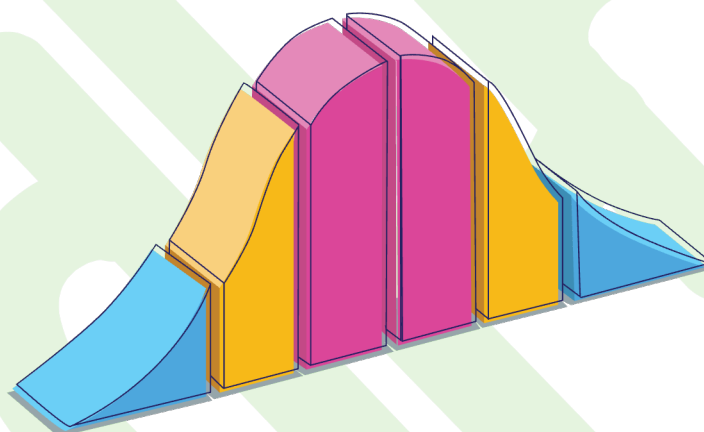


Normal Distributions

The normal distribution is the predicted distribution when considering an equally likely set of results. On a graph, this shows as a bell-shaped curve encompassing the mean, median and mode. For example, in an IQ test, most scores for the whole population would be around the mean average with decreasing scores away from this for those with lower IQ's as well as higher. In a normal distribution the mean, median and mode scores tend to be of very similar value when plotted to produce a distinctive curve. The curve shape is what we call the normal distribution curve.

Here is an example of a normal distribution curve below:

The Normal Distribution Curve



Normal Distribution Standard Variance High Variance

Practice Questions

1) Read the following information.

At a school sports day, students were asked to run 100 metres on the running track as quickly as they could before and after drinking 150 ml of an energy drink. The researcher recorded the times taken to run 100 metres for each student.

Identify the type of experiment used in this study – **Pick one answer only**

- A) Field
- B) Independent groups
- C) Laboratory
- D) Matched Pairs
- E) Repeated measures

(1 mark)

2) Identify the experimental design used in this study.

Pick one answer only.

- A) Field
- B) Independent groups
- C) Laboratory
- D) Matched Pairs
- E) Repeated measures

[1 mark]

3) Explain one difference between primary and secondary data

[3 marks]

4) Read the following information.

In a sixth form centre, students have independent study lessons as well as subject lessons. Students use the sixth form learning area during their independent study lessons. They are expected to use their study lessons to finish work related to their subjects.

Teachers are concerned that some students spend more time chatting to friends than finishing work during study lessons. A researcher is asked to investigate how students are using study lessons.

The researcher asked 30 students to fill in a questionnaire about how they spend their study lessons. They selected participants using stratified sampling.

Explain one weakness of using a stratified sample when conducting research.

[2 marks]

The responses of participants to Question 1 of the questionnaire are shown in Table 2.

Table 2 Responses of participants to Question 1:

‘Do you think your progress in lessons is positively affected by the amount of time you spend doing independent study?’

YES	NO
19	11

Table 2.

5) Calculate the percentage of participants who responded YES.

State your answer using **two** significant figures and show your workings.

Workings:

[3 marks]

The mean estimates for 30 participants are shown in Table 3.

Activity	Mean estimated time (in minutes)
Time spent working during a typical 70 minute study lesson.	60
Time spent chatting to friends during a typical 70 minute study lesson.	10

Write this ratio in its simplest form.

[2 marks]

7) Read the following information.

The researcher wanted to find out more about the types of learning activity happening during study lessons. They decided to observe the actual behaviour of the same participants during study lessons. They worked with an assistant using CCTV camera recordings of the sixth form learning area during study lessons. They used recordings taken over the past two days.

Identify **two** ethical issues that researchers should consider in observation studies.

[2 marks]

Ethical Issue 1)

Ethical Issue 2)

8) Sketch a **frequency table** the researcher and their assistant can use to collect information about the types of learning activity participants do during study lessons.

Include **two** categories of behaviour about **types of learning activity** in your frequency table.

Do not include 'chatting to friends' and 'completing work' as categories of behaviour.

[4 marks]

9) The psychologist and their assistant had high interobserver reliability in their observation study.

Define what is meant by 'interobserver reliability' in observational research.

[2 marks]

10) From the results of the observation, the researcher realised that students spent more time chatting to friends during study lessons than they had estimated on the questionnaire.

Briefly evaluate the use of questionnaires in psychological research.

In your answer, refer to the questionnaires about the use of study lessons that the sixth form students had filled in.

[5 marks]

11) Which **one** of the following is a feature of an interview?

circle one answer.

- A) Changing an independent variable in a controlled environment
- B) Directly asking people questions
- C) Investigating a specific group in depth
- D) Watching the behaviour of a group of people

[1 mark]

12) Which **one** of the following is most likely to achieve a representative sample?

Circle **one** answer only.

- A) Opportunity
- B) Random
- C) Stratified
- D) Systematic

[1 mark]

13) Name the descriptive statistic that is calculated by ordering the values in a set of data then selecting the middle value.

[1 mark]

14) Define what is meant by 'secondary data'.

[2 marks]

15) Read the following information.

A psychologist investigated whether an environmental cue could influence participant behaviour.

The environmental cue he used was smell.

He asked 60 participants to sit at a desk and complete a questionnaire. When they had completed the questionnaire, he gave each of them a doughnut as a reward.

30 of the participants completed the questionnaire in a room that smelled of cleaning product (the smell group). The other 30 participants completed the questionnaire in a room that did not smell of cleaning product (the no smell group).

The psychologist recorded whether each participant cleaned their desk after eating their doughnut.

Identify the dependent variable **and** both conditions of the independent variable in this experiment.

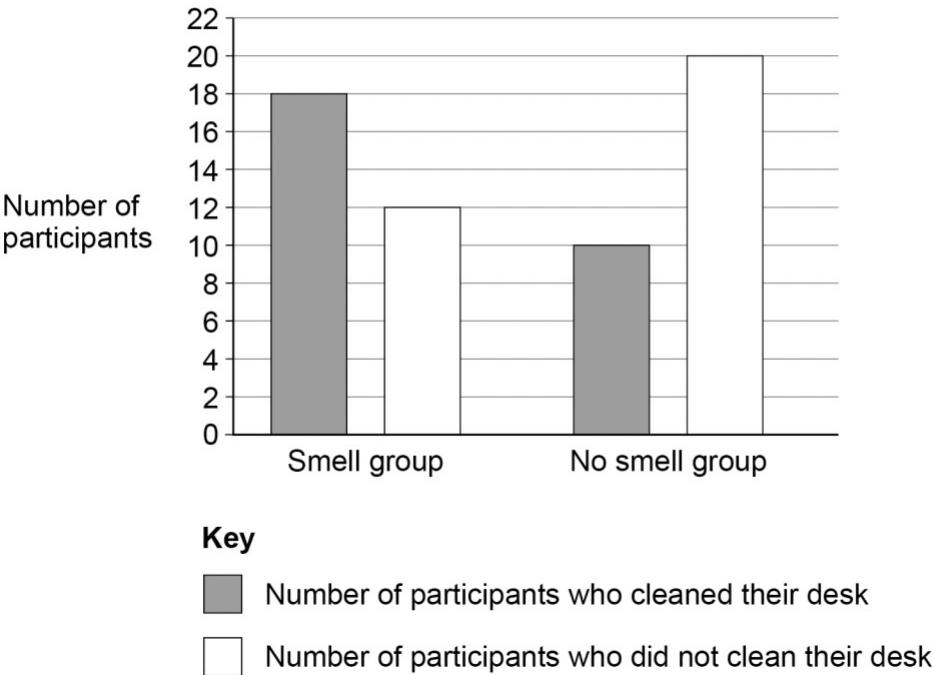
Write your answer in the space provided below.

[3 marks]

Dependent variable:

Independent variable:

Figure 1 Bar chart to show the number of participants who did and did not clean their desk in the smell and no smell groups.



The results of this experiment are shown in **Figure 1**.

16) Use this information to complete the table below.

[2 marks]

	Smell group	No smell group
Number of participants who cleaned their desk	18	
Number of participants who did not clean their desk	12	

17) 33.3% of participants cleaned their desk in the no smell group.

Calculate the percentage of participants who cleaned their desk in the smell group.

Use the information from the previous question.

Show your workings below:

[2 marks]

18) State whether the environmental cue of smell did or did not influence participant behaviour in this experiment.

Use the data in Figure 1 to explain your answer.

[3 marks]

19) Name the experimental design used by the psychologist in this study.

Explain your answer.

[2 marks]

Experimental design:

Explain your answer:

20) Explain **one** weakness of using the experimental design you named in the previous question.

[2 marks]

21) Evaluate the use of correlations in psychological research.

[6 marks]

22) Which of the following is **most likely** to give secondary data?

Circle **one** answer only.

- A) Asking participants to complete a questionnaire about their favourite shops
- B) Collecting information already published by high street retailers
- C) The researcher interviewing shoppers in a supermarket
- D) The researcher observing participants in a shopping centre

[1 mark]

23) Which of the following sets of data is normally distributed?

Circle **one** answer only.

- A) mean = 24 median = 26 mode = 29
- B) mean = 26 median = 26 mode = 26
- C) mean = 29 median = 20 mode = 25
- D) mean = 29 median = 26 mode = 24

[1 mark]

24) Read the following information.

A researcher wanted to investigate whether the timing of the school day affected student attendance. The head teacher at a local school allowed him to carry out an experiment with all 190 Year 9 students over an eight-week period.

In the first part of the experiment, the school day began at 8.30 am and finished at 3.30 pm for four weeks (the early start condition).

In the second part of the experiment, the school day began at 10.00 am and finished at 5.00 pm for four weeks (the late start condition).

The researcher recorded the total number of school days missed for Year 9 students during the first and second parts of the experiment.

Identify the independent variable in this experiment.

[1 mark]

25) Identify the dependent variable in this experiment.

[1 mark]

26) Write a null hypothesis that the researcher can use in this experiment.

[2 marks]

Table 2: Total number of days missed by 190 Year 9 students in the early and late start conditions.

	Early start condition	Late start condition
Total number of days missed	266	76

27) Table 2 shows the total number of days missed by 190 Year 9 students in the early and late start conditions.

Calculate the **mean** number of days missed by students in the late start condition.

Show your workings:

Answer:_____

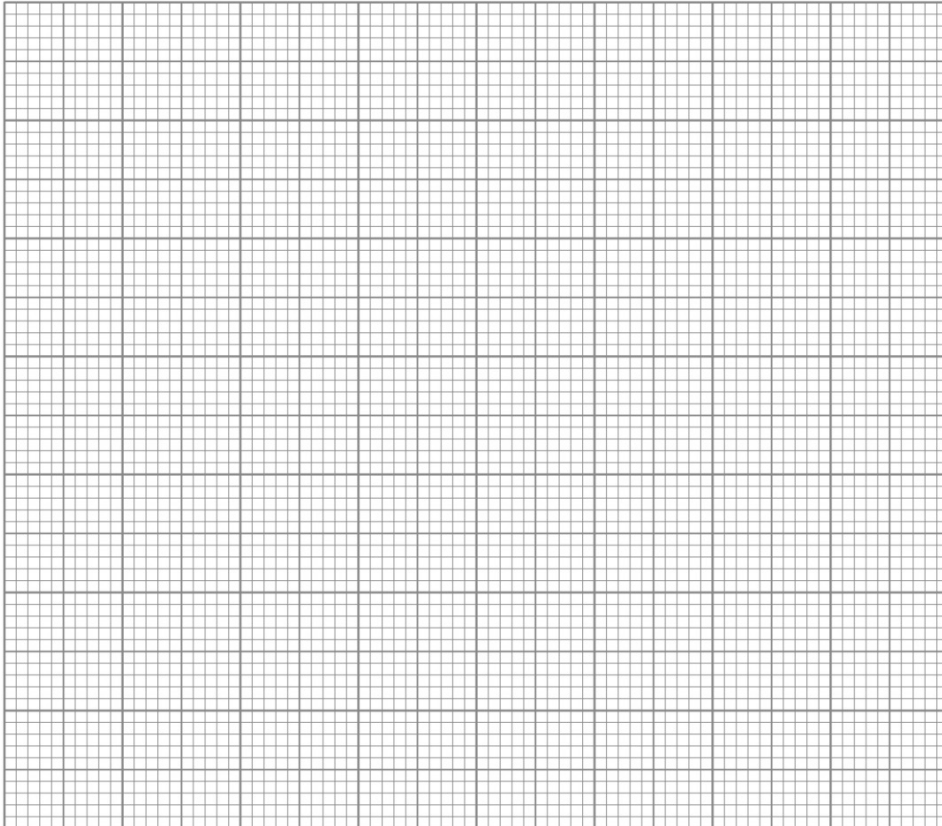
[2 marks]

28) The mean for the early start condition was 1.4

Use this mean and your calculated mean from question the previous question to sketch a suitable graph to show the mean number of days missed by each student in the early and late start conditions.

Label the axes and provide a suitable title for your graph.

[4 marks]



29) The researcher used a repeated measures experimental design. He also used counterbalancing. Explain why researchers often use counterbalancing with a repeated measures experimental design.

[2 marks]

Five horizontal green bars for writing the answer to question 29.

30) This study is an example of a field experiment.

Evaluate the use of field experiments in psychological research.

[5 marks]

31) The psychologist wanted to interview a sample of the students in his experiment to find out how they felt about starting school earlier and later in the day. He thought about using either opportunity or systematic sampling to get his sample of students.

Outline **both** opportunity **and** systematic sampling.

Compare the use of these sampling methods using your knowledge of their strengths **and/or** weaknesses.

[6 marks]

32) Which **two** of the following are commonly understood to be advantages of case studies?

Circle **two** answers.

- A) The conclusions drawn are objective.
- B) The findings can be easily generalised to the behaviour of other people.
- C) They are easy for others to replicate.
- D) They can be used to study rare and unusual behaviours.
- E) They provide rich and detailed information

[2 marks]

33) Which **one** of the following statistics is calculated by finding the difference between the smallest and largest values in a set of data?

Circle **one** answer.

- A) Mean
- B) Median
- C) Mode
- D) Range

[1 mark]

34) Outline what is meant by independent groups **and** repeated measures.

Discuss the **strengths** and **weaknesses** of **both** of these types of experimental design.

[9 marks]

35) Read the following information.

A researcher wanted to investigate whether physical exercise affected the mental well-being of firefighters.

He used stratified sampling to select 10 participants from a local fire department. He asked each participant to keep a diary for one month. Participants were asked to record the amount of exercise they completed each day. They were also asked to record a daily mental well-being score using the scale shown in **Table 2**.

Table 2: Mental well-being rating scale

Over the past day	All of the time	Often	Some of the time	Rarely	None of the time
I have felt confident.	5	4	3	2	1
I have felt relaxed.	5	4	3	2	1
I have dealt with problems well.	5	4	3	2	1
I have felt cheerful.	5	4	3	2	1

Total score: _____

36) Outline **one** strength of using a stratified sample when conducting research.

[2 marks]

37) Give a definition of both qualitative and quantitative data.

[2 marks]

Qualitative date:

Quantitative data:

38) When collecting information about mental well-being, explain why collecting qualitative data rather than quantitative data may increase the validity of the data collected by the researcher.

[2 marks]

39) Read the following information.

At the end of the month, the researcher analysed the diaries completed by participants. He calculated the average number of minutes each participant exercised daily and the average mental well-being score for each participant for the whole month. The results are shown in **Table 3**.

Table 3: The average daily exercise and mental well-being score for each participant

Participant number	Average daily exercise (minutes)	Average mental well-being score
1	30	14
2	12	11
3	5	8
4	2	7
5	8	10
6	14	10
7	30	12
8	15	11
9	28	15
10	45	15

Identify the mode for the average daily exercise scores shown in **Table 3**.

Mode for average daily exercise:.....

[1 mark]

40) Calculate the median for the average mental well-being scores shown in **Table 3**.

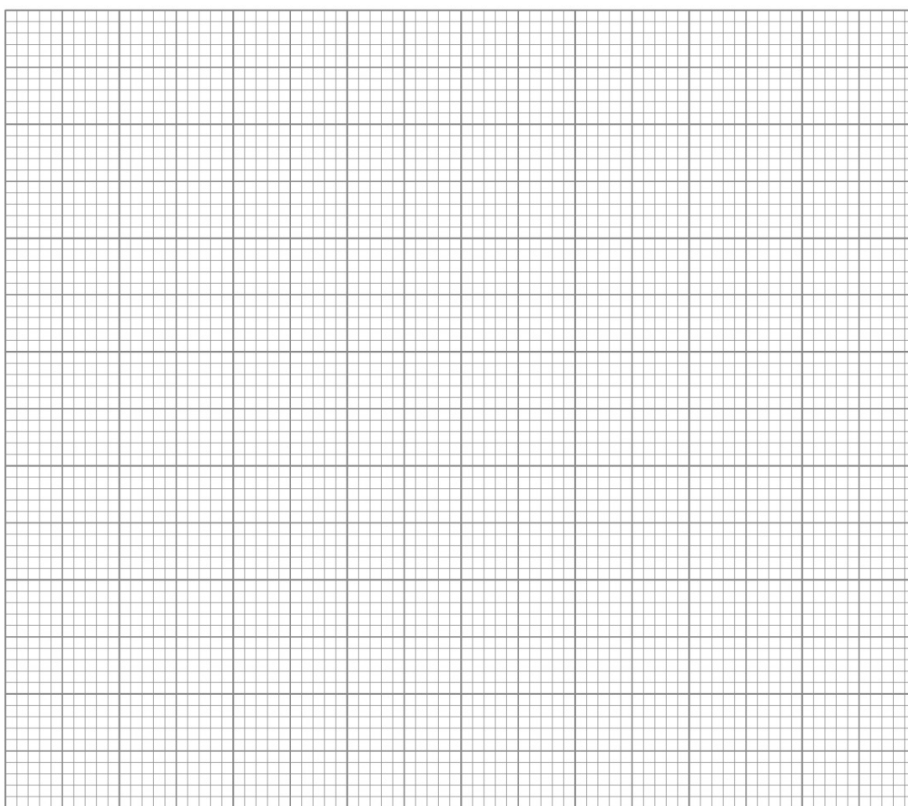
Median for average daily exercise.....

[1 mark]

41) Use the graph below to sketch a scatter diagram to show the results shown in **Table 3**.

Provide a suitable title and labels for your diagram

[4 marks]



42) Identify the type of correlation the researcher has found between exercise and mental well-being. Circle **one** option only.

A) Negative Correlation

B) No Correlation

C) Perfect Correlation

D) Positive Correlation

[1 mark]

43) Read the following information

A researcher knows that there are many different things that people can use their mobile phones for. She wants to study the differences between how males and females use their phones. The researcher and an assistant observe members of the public at a local café and record how both males and females are using their phones. One behaviour being observed is 'making phone calls'.

In the box below, sketch a frequency table the researcher and her assistant can use to collect their results.

Other than 'making phone calls' include two categories of behaviour in your frequency table.

[4 marks]

Sketch your frequency table in this box:

44) Outline **two** ways the researcher and her assistant could make sure they have high interobserver reliability in their study.

[2 marks]

1.

2.

45) The people in the café do not know that a study is taking place and that they are being observed. This means they did not agree to take part or give the researcher permission to record their behaviour. Therefore the researcher did not get consent from the participants in her study.

Explain what is meant by ethical issues in psychological research.

[2 marks]

46) Explain how the researcher might deal with the lack of consent in this study.

[2 marks]

47) Read the following information.

The researcher is also interested in whether or not there is a difference in how long males and females spend using their mobile phone each day. She decides to study this by asking a sample of 10 males and 10 females in the café to complete a questionnaire about their daily phone use.

Write a suitable hypothesis for this study.

[2 marks]

48) What is meant by an 'extraneous variable'?

[1 mark]

49) Identify **one** extraneous variable the researcher needs to consider and suggest how this variable may affect the results if she does not deal with it.

[3 marks]

50) Outline **one** problem that might occur because the researcher is using a questionnaire to collect her data.

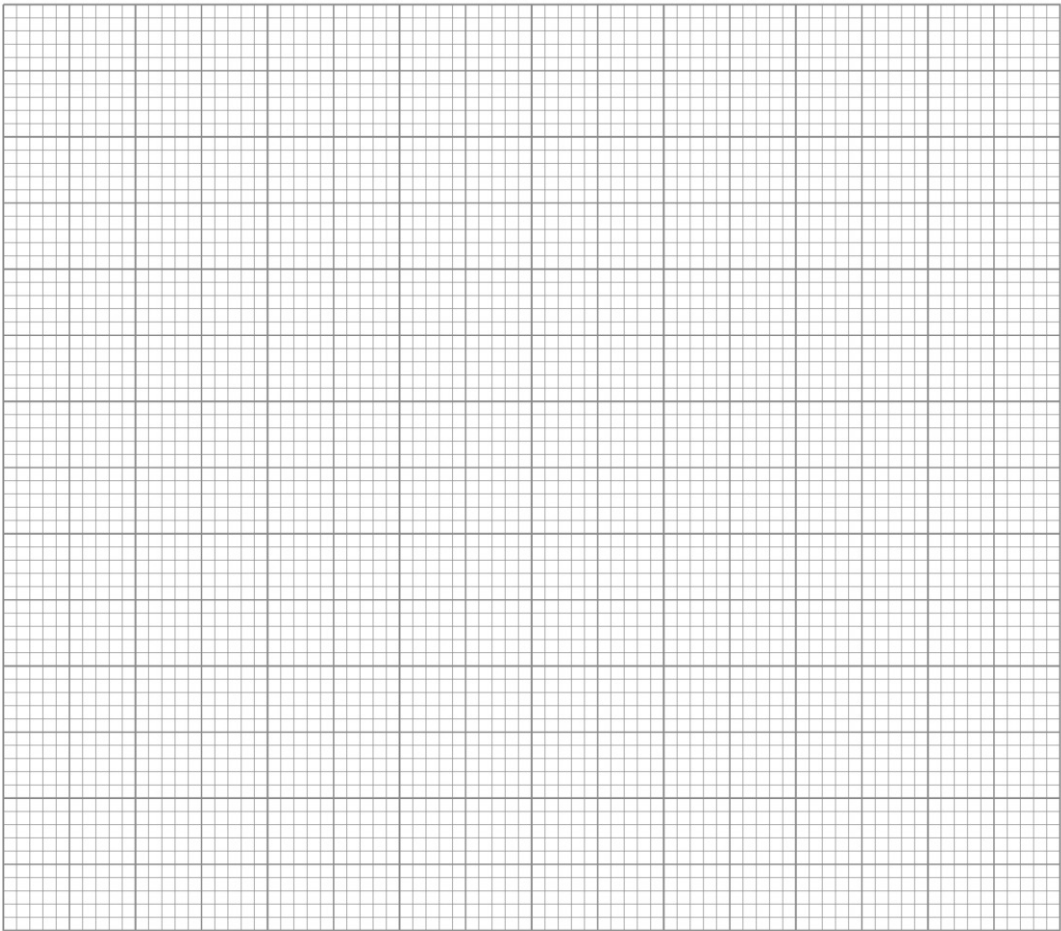
[2 marks]

51) After the questionnaires were completed, the researcher used the answers to record the daily phone use of the males and females. The results are shown in **Table 2**.

Table 2: The daily phone use of males and females.

Males	Daily phone use (minutes)	Females	Daily phone use (minutes)
1	120	1	80
2	25	2	75
3	50	3	200
4	80	4	60
5	170	5	95
6	15	6	100
7	180	7	120
8	30	8	175
9	100	9	55
10	190	10	140
Mean phone use in minutes	96	Mean phone use in minutes	110

Use the graph paper to sketch a suitable bar chart to show the mean results shown in **Table 2**.
Provide a suitable title and labels for your diagram. **[3 marks]**



52) Calculate the range for the daily phone use of males and females. **[2 marks]**

Range for males:

Range for females:

53) Use the ranges you calculated in the previous question to write one conclusion the researcher could draw from the information collected in her questionnaires.

[2 marks]

Revision Timetable	Mon	Tues	Weds	Thurs	Fri	Sat	Sun	Subject or topic
9am								
10am								
11am								
12pm								
1pm								
2pm								
3pm								
4pm								
5pm								
6pm								
7pm								
8pm								



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